Space Weather Forecast

Issued on Wednesday, 07 February 2024 at 01:23 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate flares expected, with a chance of isolated Strong flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate, with the peak flare a Moderate flare peaking at 06/0312UTC from the large region in the southwest. There are ten sunspot regions however most of these are small and either stable or fading with only two of particular note. A large and active region on the southeast disc has a complex but ragged main spot which includes some complex magnetic fields including close proximity opposite polarities. The other main region is a smaller but still complex and active area in the southwest disc, which is becoming hard to assess due to both its southern and western location, however this consists of two close proximity opposite magnetic polarity spots, leading to an unstable configuration.

Further analysis of the coronal mass ejection (CME) that left the Sun in association with the Moderate flare from the large region in the southwest this morning gives a reduced potential for a glancing blow into the 09 February. The large CME visible on coronagraph imagery from around 06/1200UTC has been assessed as far-sided, though analysis and modeling of a further narrow CME from the center northern disk at a similar time is ongoing.

Solar Wind / Geomagnetic Activity: Solar winds were indicative of a weak fast wind from a coronal hole. Slightly elevated at just under 500km/s for much of the period with a recent slight reduction down towards 430-460km/s. The Interplanetary Magnetic field (IMF) was weak to moderate. The important north-south component varying more weakly. Geomagnetic activity was mostly Quiet (Kp0-2), with an Unsettled (Kp3) interval in the early hours of the UTC day 06 February.

Energetic Particles / Solar Radiation: The count rate of energetic particles became slightly elevated following the Moderate flare early on the 06 February but remained below the S1 threshold and has slowly returned towards background.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity expected, with further Moderate flares and an initial chance of Strong flares. These most likely from either the large complex region in the southeast, or from the smaller region in the southwest. This risk decreases slightly day 2 onward as the southwest spot recedes on the far-side.

Solar Wind / Geomagnetic Activity: Current coronal hole sourced fast winds are expected to gradually ease through day 1 (07 Feb), with slightly elevated speeds easing towards background. The CME that left the Sun in association with the M4.2 flare in the morning of 06 February may provide a slight glancing blow late into day 3 (09 February), but the risk of significant impacts has been reduced.

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Geomagnetic activity is expected to be mostly Quiet to Unsettled.

Energetic Particles / Solar Radiation: The count rate of energetic particles has a chance of rising above background in response to any large flares that may occur. This will bring a slight chance of reaching the S1 Minor Solar Radiation Storms level.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	70	70	70
Very Active	R3 to R5 X	No	25	20	20	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	20	20	20
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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